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Title: MARS PROXIMITY LINK OPERATIONS

Abstract

Given the recent setbacks of the Mars 98 missions, the NASA/ Jet Propulsion Laboratory (JPL) is reassessing its approach and architecture for future Mars exploration. One of the preliminary focuses of rearchitecting the Mars Program is to first establish an infrastructure at Mars that will extend key ground network services of the existing earth-based Deep Space Network, (DSN), managed by the Telecommunications and Mission Operations Directorate, (TMOD), at the NASA/JPL. Missions in the 2003 to 2005 time frame that plan to extend these network services are: NASA/JPL Mars Surveyor Project 2001, ESA Mars Express, and NASA/JPL Mars (Microsatellite) Network. For all of these missions, extending reliable communication, navigation, and time management to inbound Mars assets creates unique and challenging issues for operations. This paper addresses three of these key issues. First, it describes the operational scenarios involved in operating point to point, point to multipoint, and multipoint to multipoint links between orbiting relays and Mars based assets. Secondly, it examines mechanisms that help transform the current schedule/manual based mode of operations into a more autonomous demand driven approach. Last, it presents a plan to transition to file transfer services using Consultative Committee for Space Data Standards (CCSDS) Proximity Link and File Transfer (CFDP) recommendations for these missions.